Space Weather Forecast

Issued on Saturday, 05 August 2023 at 01:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further isolated Moderate class flares (R1-R2; Minor-Moderate radio blackouts) throughout. Coronal Mass Ejection effects likely with a chance of Minor to Moderate Storm activity throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity over the past 24 hours is Moderate with a Moderate class flare observed at 04/0424 UTC. Eight numbered sunspot regions feature on the visible disc and one un-numbered. The largest region has rotated across the southwest limb leaving a region in the northwest as the current largest. Another couple of regions in the northwest and southeast are joint second largest regions and have not seen much change The remaining regions appear generally stable with little change. The aforementioned flare from the region in the northwest at 04/0424 UTC produced a CME (coronal mass ejection) which presents a risk of an impact early on Day 3 (7th Aug). No other significant CMEs were observed.

Solar Wind / Geomagnetic Activity: The solar wind was slow to slightly elevated, generally between 330 and 350 km/s but increasing to 420-450km/s from around 04/0900 UTC, with a gradual decline back to slow levels thereafter. The total interplanetary magnetic field strength was Moderate before jumping to mainly strong levels from 04/0700UTC as an anticipated CME arrived, before easing back to moderate levels again by 04/2000 UTC. The all-important north-south component, was generally weakly positive but with occasional moderate southward directed orientations from 04/0700 UTC. Geomagnetic activity was Quiet to Unsettled with Active intervals to end the day.

Energetic Particles / Solar Radiation: The observed count rate of energetic particles (high energy protons) was at background levels throughout.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is likely to be Low to Moderate, with the most likely Moderate class flare initially on Day 1 (5th Aug) from the recently departed region over the southwest limb, as well as the now largest region in the northwest along with the two moderate sized regions in the northwest and southeast.

Solar Wind / Geomagnetic Activity: The Geomagnetic forecast remains complex with several CME (coronal mass ejection) impacts probable through this coming period. A CME which left the Sun around 02/0900 UTC is considered to arrive Day 1 (5th Aug) or perhaps early into day 3 (6th Aug). A recent flare also produced a CME which presents a risk of an impact at Earth early on Day 3 (7th Aug). Solar winds have been generally slow, with some minor enhancement being felt from likely connection to a weak high speed stream (HSS). In the absence of any CME enhancement solar winds most likely remaining similar though the period. CME impacts however, most reliably from the 02/0900 UTC CME, could see solar winds reaching slightly elevated or perhaps elevated levels at times, 500-550km/s, particularly if they combine with HSS enhancement. Geomagnetic activity at Quiet to Unsettled levels, becoming Active at times with a chance (20-50%) of Minor to Moderate Storm intervals throughout.

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Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to remain at background levels. There is a slight chance of further enhancements from any larger flares that occur, mainly from the complex region that recently rotated across the southwest limb, for the next couple of days.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	30	50	20
Strong	G3	No	5	1	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	40	30	30
Very Active	R3 to R5 X	No	10	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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